This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A method of analyzing a multidimensional system comprising the steps of:

acquiring a plurality of signals, each signal representing a corresponding channel that is associated with a different spatial location of the multidimensional system;

generating a phase space representation for each channel as a function of the corresponding one of the plurality of signals;

generating a signal profile for each phase space representation, each signal profile reflecting a rate of divergence of the corresponding phase space representation;

choosing a selected predictor from amongst a plurality of possible predictors based on a level of entrainment of critical channel groups associated with each predictor;

for the ~~a~~ selected predictor, ~~chosen from amongst a number of possible predictors,~~ deriving a signal profile for one or more critical channel groups, each signal profile reflecting a level of correlation between the channels of each critical group; and

characterizing the state dynamics of the multidimensional system as a function of the signal profile associated with at least one critical channel group.

2. (Previously presented) The method of claim 1 further comprising the step of comparing each signal profile associated with a critical channel group to a threshold value, wherein said step of characterizing the state dynamics of the multidimensional system is based on the result of the comparison.

3. (Previously presented) The method of claim 1 further comprising the step of:

comparing each signal profile associated with a critical channel group to a disentrainment threshold value and an entrainment threshold value, wherein said step of characterizing the state dynamics of the multidimensional system is based on the result of the comparison.

4. (Previously presented) The method of claim 3 further comprising the steps of:

determining whether each signal profile associated with a critical channel group exceeded the disentrainment threshold value; and

determining whether each signal profile associated with a critical channel group drops below the entrainment threshold value.

5. (Previously presented) The method of claim 4, wherein at least one of said entrainment threshold and said disentrainment threshold is an adaptive parameter.

6. (Previously presented) The method of claim 1 further comprising the steps of:

detecting a system event indicative of non-chaotic system behavior;

for each of a plurality of predictors, deriving a signal profile for each channel groups, each signal profile reflecting a level of correlation between the channels of each channel group; and

for each of the plurality of predictors, identifying a number of critical channel groups.

7. (Previously presented) The method of claim 6 further comprising the step of:

choosing the selected predictor from amongst the plurality of predictors as a function of the signal profiles reflecting level of correlation for the critical channel groups associated with each predictor.

8. (Previously presented) The method of claim 6 further comprising the step of:

after each of a number of system events, updating the number of critical channel groups of each predictor.

9. (Previously presented) The method of claim 8 further comprising the step of:

choosing the selected predictor from amongst the plurality of predictors as a function of the signal profiles reflecting level of correlation for the critical channel groups associated with each predictor.

10. (Previously presented) The method of claim 6, wherein said step of identifying the number of critical channel groups for each predictor is based on the signal values in a limited portion of the level of correlation signal profile associated with each channel group of each predictor, preceding the system event.

11. (Previously presented) The method of claim 10, wherein said step of identifying the number of critical channel groups for each predictor is based on the signal values in a limited portion of the level of correlation signal profile associated with each channel group of each predictor, subsequent to the system event.

12. (Previously presented) A method of providing seizure warnings comprising the steps of:

acquiring a plurality of time-series signals, each signal associated with a different location of the brain, and where each signal and its corresponding location constitute a corresponding channel;

generating a spatio-temporal response for each channel as a function of a corresponding one of the time-series signals;

generating a signal profile for each spatio-temporal response, each signal profile comprising a sequence of chaoticity values reflecting a rate of divergence of the corresponding spatio-temporal response;

detecting at least one seizure-related event;

after each at least one seizure-related event, determining, for each of a plurality of predictors, a level of entrainment associated with each channel group for each predictor, and based on the level of entrainment associated with each channel group, determining a number of critical channel groups for each predictor;

choosing a selected predictor from amongst the plurality of predictors based on the level of entrainment of the critical channel groups associated with each predictor;

determining when the level of entrainment associated with one or more of the critical channel groups of the selected predictor is statistically significant; and

generating a seizure warning when it is determined that the level of entrainment associated with at least one critical channel group of the selected predictor is statistically significant.

13. (Previously presented) The method of claim 12, wherein said step of generating a signal profile for each spatio-temporal response involves generating a sequence of Lyapunov exponent values for each spatio-temporal response.

14. (Previously presented) The method of claim 13, wherein the Lyapunov exponent values are short-term Lyapunov exponent values.

15. (Previously presented) The method of claim 12, wherein said step of determining, for each of the plurality of predictors, the level of entrainment associated with each channel group is based on the level of entrainment within a time window, the majority of which precedes the at least one seizure-related event, where the at least one seizure-related event is an entrainment transition event.

16. (Previously presented) The method of claim 12, wherein said step of determining, for each of the plurality of predictors, the level of entrainment associated with each channel group is based on the level of entrainment within a first time window preceding the at least one seizure-related event and a second time window subsequent to the at least one seizure-related event, where the at least one seizure-related event is a seizure.

17. (Previously presented) The method of claim 12, wherein said step of determining, for each of the plurality of predictors, the level of entrainment associated with each channel group comprises the step of:

generating a sequence of T-index values for each channel group.

18. (Previously presented) The method of claim 12, wherein said step of choosing the selected predictor from amongst the plurality of predictors comprises the step of:

comparing the level of entrainment associated with the critical channel groups of each of the plurality of the predictors.

19. (Previously presented) The method of claim 18, wherein the selected predictor has critical channel groups that exhibit relatively high levels of entrainment prior to seizures as compared to the critical channel groups associated with other predictors.

20. (Previously presented) The method of claim 19, wherein the selected predictor has critical channel groups that exhibit disentrainment following seizures as compared to the critical channel groups associated with other predictors.

21. (Previously presented) The method of claim 12, wherein the selected predictor has critical channel groups that exhibit relatively high levels of entrainment during entrainment transition events as compared to the critical channel groups associated with other predictors.

22. (Currently amended) The method of claim 12, wherein the selected predictor has critical channel groups that exhibit relatively high levels of entrainment prior seizures and entrainment transition events, and ~~relatively~~ exhibit disentrainment following seizures and entrainment transition events.

23. (Previously presented) The method of claim 12, wherein said step of determining when the level of entrainment associated with one or more of the critical channel groups of the selected predictor is statistically significant comprises the step of:

comparing the level of entrainment associated with each critical channel group of the selected predictor to at least one threshold value.

24. (Previously presented) The method of claim 23, wherein said step of comparing the level of entrainment associated with each critical channel group of the selected predictor to at least one threshold value comprises the step of:

comparing the level of entrainment associated with each critical channel group of the selected predictor to an entrainment threshold value.

25. (Previously presented) The method of claim 24, wherein said step of comparing the level of entrainment associated with each critical channel group of the selected predictor to at least one threshold value further comprises the step of:

comparing the level of entrainment associated with each critical channel group of the selected predictor to a disentrainment threshold value, and wherein a determination that the level of entrainment associated with one or more of the critical channel groups of the selected predictor is statistically significant involves a determination that the level of entrainment has exceeded the disentrainment threshold value and subsequent thereto dropped below the entrainment threshold.

26. (Previously presented) The method of claim 12 further comprising the step of:

generating a seizure prediction when it is determined that the level of entrainment associated with at least one critical channel group of the selected predictor is statistically significant.

27. (Previously presented) The method of claim 12 further comprising the step of:

updating each critical channel group of the selected predictor after each subsequent seizure-related event.

28. (Previously presented) The method of claim 27, wherein said step of updating each critical channel group of the selected predictor comprises the step of:

reselecting one or more critical channel groups for the selected predictor as a function of the level of entrainment, associated with each channel group of the selected predictor, within a time window, the majority of which precede the seizure-related event, where the seizure-related event is an entrainment transition event.

29. (Previously presented) The method of claim 27, wherein said step of updating each critical channel group of the selected predictor comprises the step of:

reselecting one or more critical channel groups for the selected predictor as a function of the level of entrainment, associated with each channel group of the selected predictor, within a first tune window preceding the seizure-related event and a second time window following the seizure-related event, where the seizure-related event is a seizure.

30. (Previously presented) A method of providing seizure warnings comprising the steps of:

choosing a selected predictor from amongst a plurality of predictors;

acquiring a plurality of time-series signals, each signal associated with a different location of the brain, and where each signal and its corresponding location constitute a corresponding channel;

generating a spatio-temporal response for each channel as a function of a corresponding one of the tune-series signals;

generating a signal profile for each spatio-temporal response, each signal profile comprising a sequence of chaoticity values reflecting a rate of divergence of the corresponding spatio-temporal response;

determining whether the level of entrainment associated with one or more critical channel groups of the selected predictor is statistically significant; and

generating a seizure warning if it is determined that the level of entrainment associated with one or more critical channel groups of the selected predictor is statistically significant.

31. (Previously presented) The method of claim 30, wherein said step of determining whether the level of entrainment associated with one or more critical channel groups of the selected predictor is statistically significant comprises the step of:

comparing the level of entrainment associated with each of the one or more critical channel groups of the selected predictor to at least one threshold value.

32. (Previously presented) The method of claim 31, wherein said step of comparing the level of entrainment associated with each of the one or more critical channel groups of the selected predictor to at least one threshold value comprises the step of:

comparing the level of entrainment associated with each of the one or more critical channel groups of the selected predictor to an entrainment threshold value.

33. (Previously presented) The method of claim 32, wherein said step of comparing the level of entrainment associated with each of the one or more critical channel groups of the selected predictor to at least one threshold value further comprises the step of:

comparing the level of entrainment associated with each of the one or more critical channel groups of the selected predictor to a disentrainment threshold value, and wherein a determination that the level of entrainment associated with one or more of the critical channel groups of the selected predictor is statistically significant involves a determination that the level of entrainment has exceeded the disentrainment threshold value and subsequent thereto dropped below the entrainment threshold.

34. (Previously presented) The method of claim 30 further comprising the step of:

generating a seizure prediction when it is determined that the level of entrainment associated with one or more critical channel groups of the selected predictor is statistically significant.

35. (Previously presented) The method of claim 30 further comprising the step of:

updating the one or more critical channel groups of the selected predictor after each seizure-related event.

36. (Previously presented) The method of claim 35, wherein said step of updating the one or more critical channel groups of the selected predictor comprises the step of:

reselecting the one or more critical channel groups of the selected predictor as a function of the level of entrainment, associated with each channel group of the selected predictor, within a time window, the majority of which precedes the seizure-related event, where the seizure-related event is an entrainment transition event.

37. (Previously presented) The method of claim 35, wherein said step of updating the one or more critical channel groups of the selected predictor comprises the step of:

reselecting the one or more critical channel groups of the selected predictor as a function of the level of entrainment, associated with each channel group of the selected predictor, within a first time window preceding the seizure-related event and a second time window following the seizure-related event, where the seizure-related event is a seizure.

38. (Currently amended) An apparatus providing seizure interdiction comprising:

a plurality of sensors, each configured for acquiring a tune-series signal associated with a corresponding location of a patient's brain;

processing means for generating a seizure warning based on the time-series signals, said processing means comprising,

means for receiving the time-series signals; wherein each time-series signal along with the corresponding location of the patient's brain constitutes a separate channel;

means for generating a phase space representation for each channel as a function of the corresponding one of the plurality of signals;

means for generating a signal profile for each phase space representation, each signal profile reflecting a rate of divergence of the corresponding phase space representation;

means for choosing a selected predictor from amongst a plurality of possible predictors;

means for deriving a signal profile for each of a number of critical channel groups associated with the ~~a~~ selected predictor, ~~chosen from amongst a number of predictors,~~ each signal profile reflecting a level of entrainment among the channels of each critical channel group;

means for determining whether a level of entrainment associated with one or more critical channel groups of the selected predictor is statistically significant;

means for generating a seizure warning if it is determined that the level of entrainment associated with one or more critical channel groups of the selected predictor is statistically significant; and

a seizure interdiction device coupled to said processing means, said seizure interdiction device comprising means for delivering antiseizure treatment to the patient if a seizure warning signal is generated.

39. (Previously presented) The apparatus of claim 38, wherein said processing means further comprises:

means for updating the one or more critical channel groups for the selected predictor after each of a number of seizure-related events.

40. (Previously presented) The apparatus of claim 39, wherein said means for updating the one or more critical channel groups comprises:

means for reselecting the one or more critical channel groups of the selected predictor as a function of the level of entrainment, associated with each channel group of the selected predictor, within a tune window, the majority of which precedes the seizure-related event, where the seizure-related event is an entrainment transition event.

41. (Previously presented) The method of claim 39, wherein said means for updating the one or more critical channel groups comprises:

means for reselecting the one or more critical channel groups of the selected predictor as a function of the level of entrainment, associated with each channel group of the selected predictor, within a first time window preceding the seizure-related event and a second time window following the seizure-related event, where the seizure-related event is a seizure.